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EFFECTS OF FEBRILE SEIZURES IN THE IMMATURE RAT MODEL ON INTERNEURONAL PARVALBUMIN (PV) EX-PRESSION IN THE DENTATE GYRUS

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RATIONALE: A febrile seizure model, recently established in the immature rat (Baram et al., Brain Res, 1997) may serve as a valuable tool to study the effects of these seizures on the developing hippocampus. Loss of dentate gyrus PV-immunoreactivity after experimentally induced seizures has been reported in other models, and has been interpreted as either loss of interneurons or their dysfunction, leading to granule cell disinhibition. OBJECTIVE: To test the hypothesis that PV expression is persistently down-regulated after febrile seizures. METHODS: Hyperthermic seizures (mean duration 21 min) were induced on postnatal day 10. PV-mRNA and protein levels were evaluated using in situ hybridization and immunocytochemistry (ICC), respectively. Quantitative analysis of PV-expressing neurons in dentate gyrus was achieved blindly, using stereologic approaches. RESULTS: The number of PV expressing neurons of experimental and control groups were not significantly different at 4 hours, 1 week or 4 weeks after seizures. For example, at 1 week, PV-immunoreactive neurons totaled 4353±298 and 4361±471 in controls and experimentals, respectively (n = 3); corresponding values at 4 weeks were 6362±611 and 6378±734 (n=4). In addition, PV-mRNA expression (at 4 hours and 4 weeks) was not down-regulated after the hyperthermic seizures. CONCLUSION: In this model of developmental seizures, down-regulation of PV expression is not observed, consistent with (compensatory?) increased inter-neuron-mediated inhibition (Chen et al., Soc. Neurosci. abst., 1998) reported in the same model. The molecular mechanisms of the long-lasting enhanced susceptibility of rats experiencing febrile seizures to hippocampal convulsants (Dube et al., this meeting) require further study. (Supported by NIH NS35439)